Grima MAT 151 Chapter 2 Practice test

1) M varies inversely as the square root of n. M is 4 when n is 25. Find M when n is 16.

1) M is some number divided by the square root of n.

$M = \frac{k}{\sqrt{n}}$

2) $4 = \frac{k}{\sqrt{25}}$

$\cancel{\frac{4}{1} = \frac{k}{5}}$

$k = 20$

3) $M = \frac{20}{\sqrt{16}} = \frac{20}{4}$

$\boxed{M = 5}$

2) Y varies jointly as the cube of x and the square of z. Y is 144 when x is 2 and z is 3. Find Y when x is 3 and z is 2.

1) Y is some number times the cube of x and the square of z.

$Y = kx^3z^2$

2) $144 = k(2)^3(3)^2$

$144 = k(8)(9)$

$\frac{144}{72} = \frac{72k}{72}$

$2 = k$

3) $Y = 2(3)^3(2)^2$

$\boxed{Y = 216}$

3) Suppose that the demand (D) for candy at a movie theater is inversely related to the square root of the price (p). When the price of candy is \$4.00 per bag, the theater sells 150 bags of the candy. Determine the number of bags of candy that will be sold if the price is raised to \$9.00 per bag.

1) D is inversely related to the square root of p

$$D = \frac{k}{\sqrt{p}}$$

2) $150 = \frac{k}{\sqrt{4}}$

$$\cancel{\frac{150}{1} = \frac{k}{2}}$$

$$k = 300$$

3) $D = \frac{300}{\sqrt{9}} = \frac{300}{3} = 100$

$$\boxed{\text{100 bags of candy}}$$

4) The distance (D) it takes a car to stop is directly proportional to the square of the speed (s) it is moving. A car traveling 10 miles per hour can stop in 15 feet. How long will it take a car traveling 40 miles per hour to stop?

1) D is directly proportional to the square of s.

$D = ks^2$

2) $15 = k(10)^2$

$$\frac{15}{100} = \frac{100k}{100}$$

$0.15 = k$

3) $D = 0.15(40)^2$

$D = 240$

$\boxed{\text{240 feet to stop}}$

#5 – 6: Use Algebra to find the x and y-intercepts.

5) 2x - 8y = 32

x-intercept (let y = 0)

$$2x - 8(0) = 32$$

$$\frac{2x}{2} = \frac{32}{2}$$

$$x = 16$$

y-intercept (let x = 0)

$$2(0) - 8y = 32$$

$$\frac{-8y}{-8} = \frac{32}{-8}$$

$$y = -4$$

X-Int (16,0)

y-Int (0,-4)

9) $y = x^2 + 4x - 12$

x-intercept (let y = 0)

$$x^2 + 4x - 12 = 0$$
$$(x+6)(x-2) = 0$$
$$x+6=0 \qquad x-2=0$$
$$-6\ -6 \qquad +2\ +2$$
$$x=-6 \qquad x=2$$

y-intercept (let x = 0)

$$y = (0)^2 + 4(0) - 12$$
$$y = -12$$

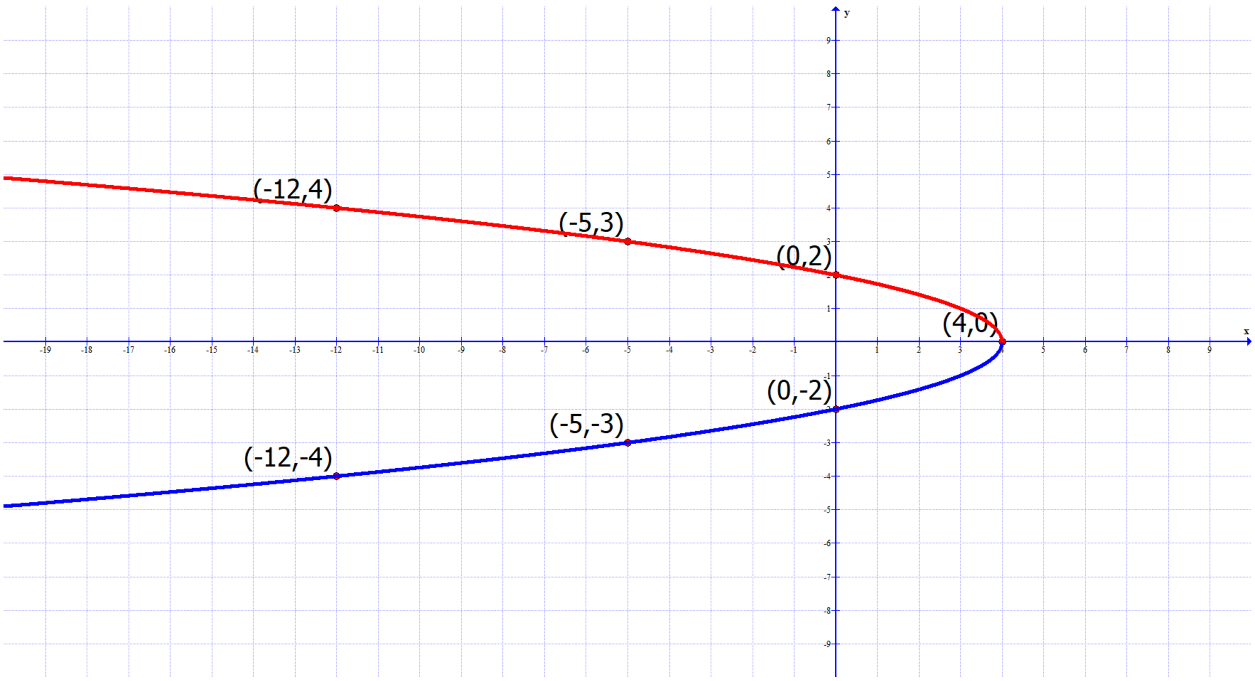
X-INT (-6,0) (2,0)

y-INT (0,-12)

#7 – 9: draw a complete graph so that it has the indicated symmetry. Make sure to show each new point on your graph.

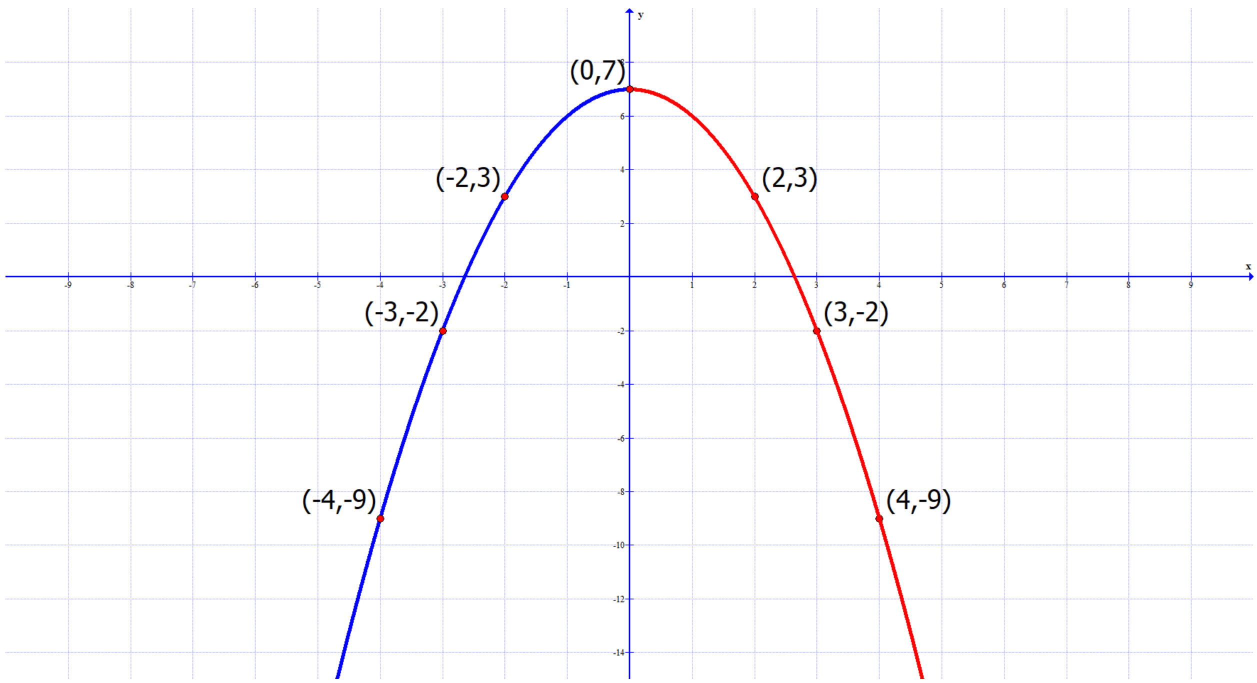
7) x-axis

Change y-coordinate of each point that was given.



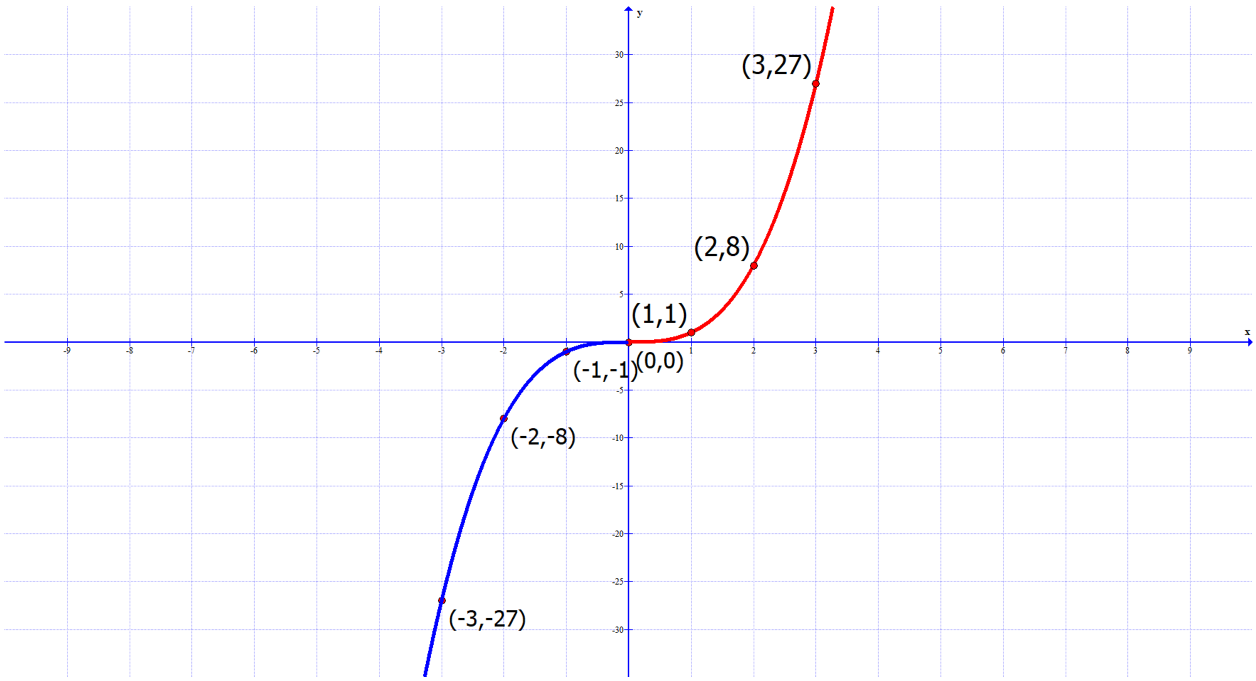
8) y-axis

Change x-coordinate of each point that was given.



9) origin

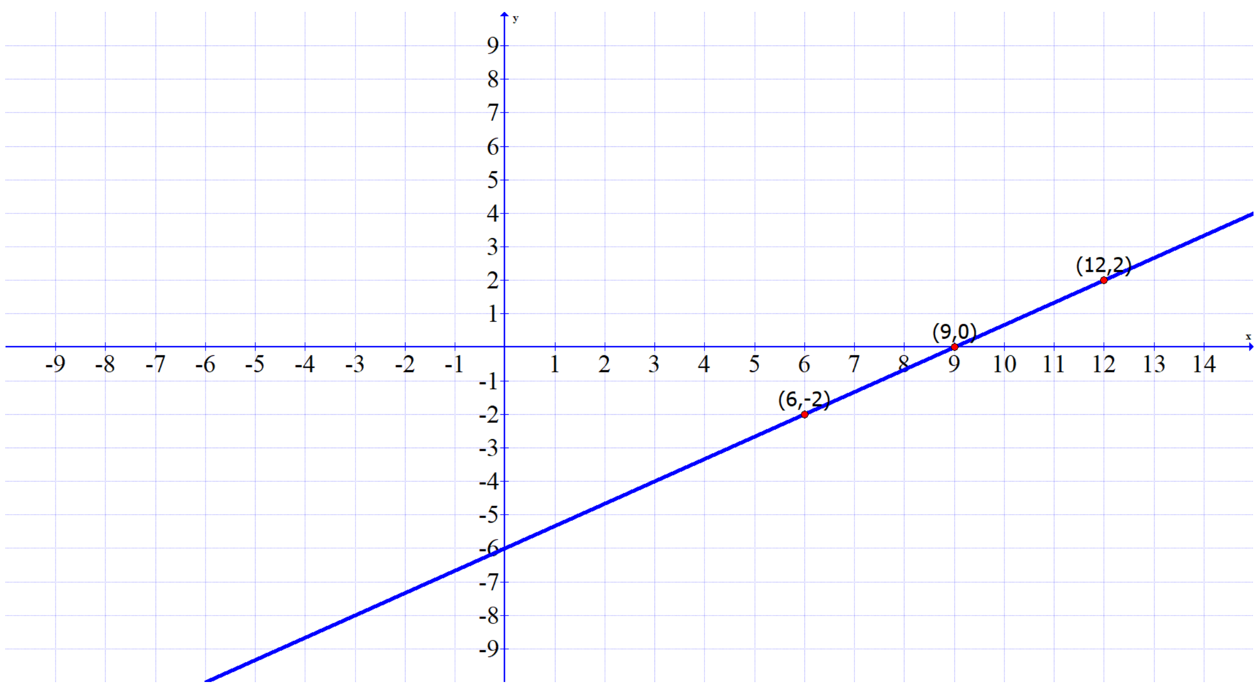
Change both the x-coordinate and y-coordinate of each point that was given.



10) Sketch the graph of a line passing through the given point with the indicated slope. Label the given point and one additional point on your graph.

$$point\ (6,-2)\ \ slope\ = \frac{2}{3}$$

Plot point (6, -2) go up 2 then right 3, at least one time



11) Find the slope of the line that passes through the two points.

$first\ point\ (-3{,}5)\ second\ point\ (5{,}9)$

$$m = \frac{9-5}{5-(-3)} = \frac{4}{5+3} = \frac{4}{8}$$

$$\boxed{m = \frac{1}{2}}$$

12) $y = \frac{-4}{3}x + 7$

a) Find the slope of the given line

$$m = -\frac{4}{3}$$

b) Find the slope of all lines parallel to the given line

(all lines parallel to the given line have the same slope)

$$m = -\frac{4}{3}$$

c) Find the slope of all lines perpendicular to the given line.

(all lines perpendicular to the given line have slopes that are negative reciprocals)

$$m = \frac{3}{4}$$

13) Use the method of your choice (point slope form or slope intercept form) to find the equation of a line with slope m, passing through the point (x, y). Write your answer in slope-intercept form.

$m = 6\ point\ (8, -4)$

$$y-(-4) = 6(x-8)$$

$$y+4 = 6x-48$$

$$-4 \qquad\qquad -4$$

$$\boxed{y = 6x-52}$$

14) Use the method of your choice (point slope form or slope intercept form) to find the equation of a line passing through the points $(7,3)$ and $(5,13)$. Write your answer in slope-intercept form.

$$m = \frac{13-3}{5-7} = \frac{10}{-2} = -5$$

$$y-3 = -5(x-7)$$

$$y-3 = -5x+35$$

$$\underline{\quad +3 \qquad\qquad +3}$$

$$\boxed{y = -5x+38}$$

15) Find the equation of the vertical line passing through the point (2, - 6).

(vertical lines only have x's, no y's)

$x=2$

16) Find the equation of the horizontal line passing through the point (2 ,-6).

(horizontal lines only have y's, no x's)

$y=-6$

17) Write the standard form of the equation of the circle with the given radius (r) and center (h,k): r = 3 (h,k) = (2, -1)

$$(x-h)^2+(y-k)^2=r^2$$

$h=2 \quad k=-1 \quad r=3$

$$(x-2)^2+(y-(-1))^2=3^2$$

18) Find the standard form of the equation of each circle.

Center (9, 1) contains the point (5, 4)

Plug the numbers into the formula, and solve for r.

$$(x-h)^2+(y-k)^2=r^2$$

$h=9 \quad k=1$

$$(x-9)^2+(y-1)^2=r^2$$

$x=5 \quad y=4$

$$(5-9)^2+(4-1)^2=r^2$$

$$(-4)^2+(3)^2=r^2$$

$$16+9=r^2$$

$$\sqrt{25}=\sqrt{r^2}$$

$$5=r$$

$$\boxed{(x-9)^2+(y-1)^2=5^2}$$

19) $x^2 + y^2 - 6x + 10y = 2$

a) Rewrite so that the equation is written in the standard form of a circle.

b) Identify the center of the circle

c) Identify the radius of the circle

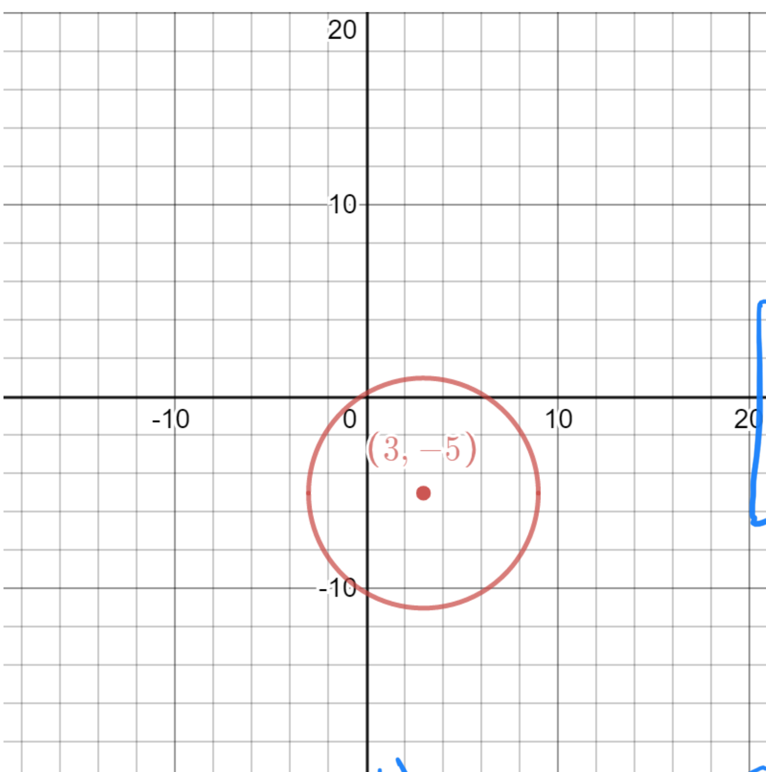
d) Sketch a graph of the circle.

a) $x^2 - 6x + C_1 + y^2 + 10y + C_2 = 2 + C_1 + C_2$

$C_1 = \left(-\frac{6}{2}\right)^2$ $\quad$ $C_2 = \left(\frac{10}{2}\right)^2$

$C_1 = (-3)^2$ $\quad$ $C_2 = (5)^2$

$C_1 = 9$ $\quad$ $C_2 = 25$



$x^2 - 6x + 9 + y^2 + 10y + 25$
$= 2 + 9 + 25$

$(x-3)^2 + (y+5)^2 = 36$

$\boxed{(x-3)^2 + (y-(-5))^2 = 6^2}$ 19a

19b) $(3, -5)$

19c) $r = 6$

19d) plot $(3, -5)$

$\uparrow \downarrow \leftarrow \rightarrow 6$